

YS-X6 Multi-Rotor Autopilot

User Manual

V1.2



www.zerouav.com

Warning and Disclaimer

1. The manual contains information about installation, debugging, and how to use the product. Please read it thoroughly before using the product.
2. Zero UAV (Beijing) Intelligence Technology Co. Ltd. assumes no liability for damage(s) or injuries incurred directly or indirectly from the use of this product.
3. Please keep far away from the crowd, children and property when using the product.
4. Install propeller after completing all the debugging and checking, to avoid damage(s) or injuries.
5. When any of the following events or incidents has taken place, we will not offer any warranty and service:
 - (1) The product has been repaired, modified, or any parts of the product have been substituted or replaced by anyone not expressly authorized by Zero UAV.
 - (2) The warranty card, the serial number of the hardware and the flight data or any of these items is lost.
 - (3) Damaged caused by user's faults such as attempting wiring not in accordance with the manual, which may cause short circuit.
6. The user manual would be modified when the firmware and specifications are changed. Please visit the official website of Zero UAV <http://www.zerouav.com> for the updates, or contact directly the factory, and authorized distributors.

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Safety Instructions

For safety reason, please **adhere to the below procedures**:

1. Please install propeller only after everything has been properly, and ensure that the setup and installation has been completed.
2. The side marked "IMU" of the IMU faces up. The arrow points to the front of the aircraft.
3. Make sure power on the RC transmitter first then power on YS-X6 autopilot before takeoff; Power off YS-X6 autopilot first, then power off RC transmitter after landing. Pay serious attention when using the S-BUS or self-adaptive feature of the autopilot.
4. Throttle calibration, manual servo position, realtime servo position, channel settings must be accurate.
5. GPS+COMPASS is sensitive to magnetic interference, should be far away from any electronic devices. The arrowhead points to head of aircraft while installing..
6. Please set F/S function of RC transmitter before the flight.
7. Do not fly in GPS mode when the signal is not good (red light blinks) or the static GPS speed is more than 15cm/s
8. The Gimbal Servo can be supplied power from output of any ESC, but when ESC has no BEC output, please add extra power not use the power supplied from Autopilot.
9. When returning home in Auto-returning home Mode, the two ways can shut down motors: When THR of RC Transmitter is maintained at the range of 0-10%; **When staying at the bottom of cross operation interface**(click "Control" in GCS). These two above ways can not work to shut down motors when in other Flight Mode.
10. The low voltage protection function is NOT for **experimenting**, please care about your flight time and try best to avoid using low voltage protection.
11. Please don't launch your craft if the GCS displays very high "vibrate state".

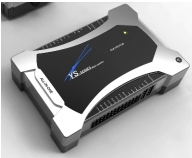
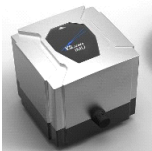



12. Must check whether the "course angle" and "magnetic declination" data are correct after compass magnetic calibration.
13. Must check whether "Attitude angle" and "Static angle" are maintaining consistency before takeoff.
14. When connecting the wires of GPS+COMPASS, IMU and MC, please pay attention to keep the color of the connectors and the labeling on the Unit body consistent. Wrong connection may result in device short-circuit.
15. Prevent Anti-plug Design The mechanisms to protect from short circuitry is NOT for fun, please don't try.
16. Please don't fly in GPS mode when course angle and real rotational angle loss consistency in some strong magnetic field, and recalibrate the compass magnetic.
17. The system is in default when RC Receiver is on and it is in auto-flight mode when RC Receiver is off. Please note the state of RC Transmitter when powering on the RC Receiver.

YS-X6 Features Introduction

YS-Series

YS-X6 is an excellent Multi-Rotor Heli autopilot, it supports common third-party commercial ESC and quad-rotor / Hex-rotor/ octo-rotor with common custom mixed control. YS-X6 offers GPS Stabilization and Auto-hover functions from quad-rotor to octo-rotor.

In Box

■Hardware □Software (Need Download)	
■Main Controller(MC) X1	
<p>The MC combines with other modules, communicates with external electronic devices to carry out autopilot functionality.</p> <p>Update firmware combining with PC R232 COM port.</p> <p>YS-GCS software record real time flight state via WIFI</p>	
■IMU X1 (Inertial measurement unit)	
<p>Contains sensors to measure the attitude of the craft.</p>	
■GPS+COMPASS X1	
<p>The GPS/Compass module is for sensing the position and direction.</p>	
■LED Indicator X1	
<p>The LED indicates current flight states of the craft via light.</p>	
■WIFI X1 (The Data radio can be added to spread range based on this)	
<ol style="list-style-type: none">1. Connect it via Mobile/Tablet hotspot function.2. Connect AP to Ground Station via WIFI.	

■GPS Bracket X1

GPS + COMPASS is sensitive to magnetic interference, please use this bracket to mount GPS module when necessary and keep it far away from EMI sources.

■3-PIN Servo Cable X8

Used to connect MC to RC Receiver.

■R232 COM port to 3-PIN Servo Cable X1

Used to connect PC to MC, Program Upgrade only.

■3M Gummed Paper (Double-side adhesive tape)

Used to fix components on multi-rotor frame

■Warranty Information Card X1

It provides Product Serial No., Purchase Date. Please fill out related information and return back to Zero UAV for registering your product warranty.

□GS Software for Android System □GS Software for Apple System

□Firmware Upgrade Software on PC.

Quick Installing Guide

Step 1:

Configure Hardware reference to "Assembly", Please check Page XX

Step 2:

Install Software reference to "GS Software Installation", Please check Page XX.

Step 3:

Setup RC Transmitter, please check Page XX.

① FUTABA RC Transmitter needs to make a fresh new model memory. Reverse channels for other RC Transmitters when necessary. Example: JR. WFLY need to reverse all channels and calibrate frequency.

② Set CH5 & CH6 to two 3-position switch on RC Transmitter.

Step 4:

Power YS-X6, connecting autopilot to GCS through WIFI, then check whether GCS Interface displays fresh data which are keeping walking.

Step 5:

Calibrate Channels reference to "Channels Calibration", please check Page XX.

Step 6:

Fill in parameters, please check PageXX

Step 7:

Set ESC Stroke (endpoint).

Ways: Get into the "Settings" on GCS without any power connected, push THR stick to the maximum position and then power the craft, after twice sound "di" push THR stick to the bottom position, meanwhile ESC will report the cell

number of battery (one "di" sound means one battery). Exit from the "Settings" after completing setup.

Step 8:

Check the mixing mode, with propeller taken out for safety reason.

Ways:

Stand at the tail of the craft and watch the front. Move the Aileron stick to the left and the left motor should stop running, do the same to the right motor. Push the ELE stick to the top and the front motor stop running, pull back ELE stick to the bottom and the rear motor stop running.

Step 9:

Calibrate the compass (request to perform this in flying field), Please check Page XX

Step10:

Test fly, please check Page XX

IMU

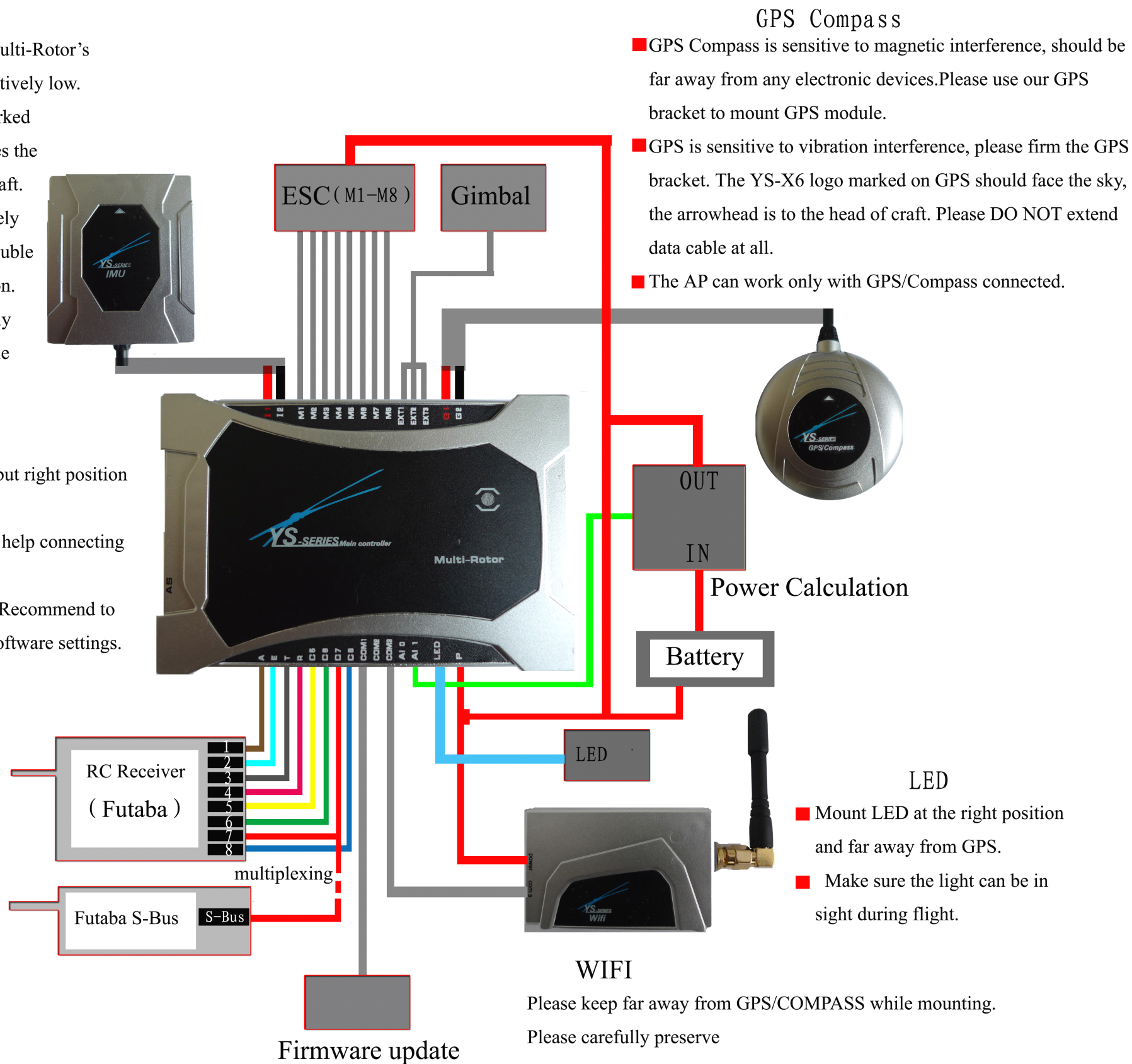
- The IMU is best positioned near the Multi-Rotor's center of gravity, where vibration is relatively low.
- Orient the IMU such that the arrow marked on the printed surface of the IMU faces the sky, the arrowhead is to the head of craft.
- The sides of the IMU should be precisely parallel to the multi rotor body. Use double-sided foam tape for secured installation.
- IMU Module is precise, please carefully preserved. DO not extend the data cable at will.

Autopilot Box

- No direction request on AP mounting but right position to avoid using ESC extending cables.
- Make sure all interfaces are exposed, to help connecting easily and upgrading firmware.
- Once the position of AP is confirmed. Recommend to firm AP after completing wiring and software settings.

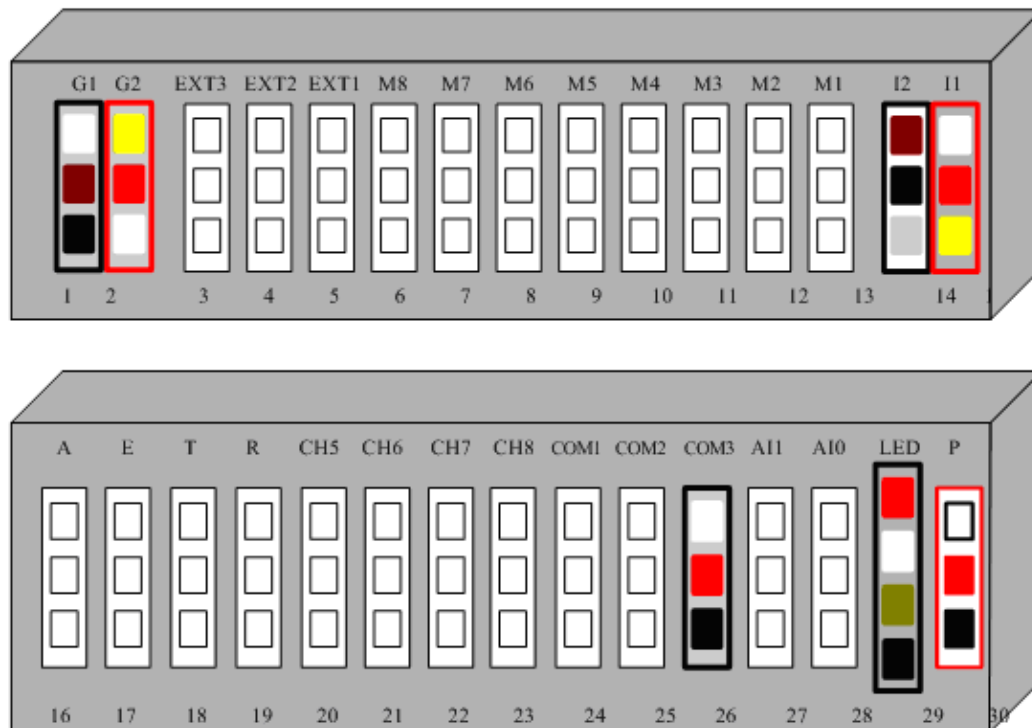
RC Receiver

- This is only connection example, please set aileron/elevator/throttle/direction/ actuator control channel on your RC Tx ready first.
- Select two 3-way switches as the switch of controlling modes, and then connect the receivers to the right channels of AP.



Notice:

- ★ Except particular notice on wires connection, the black one of all wires should be connected to the bottom of the **pin**.
- ★ While connecting, all **wirings** with color should match the same color like showing as below diagram.
- ★ **Connection labels** are facing you.
- ★ The numbers of the connectors match those marked in the diagram.



- | | |
|-----------------------------------|-------------------------------------|
| 1. GPS module plug (Black) | 16. CH1 |
| 2. GPS module plug (Red) | 17. CH2 |
| 3. Camera | 18. CH3 |
| 4. Gimbal Tilt (Pitch) | 19. CH4 |
| 5. Gimbal PAN (Roll) | 20. CH5 |
| 6. Motor8 | 21. CH6 |
| 7. Motor7 | 22. CH7 (shared with S.BUS) |
| 8. Motor6 | 23. CH8 |
| 9. Motor5 | 24. Link to PC (Firmware Upgrade) |
| 10. Motor4 | 25. NOT USED |
| 11. Motor3 | 26. WIFI Module output |
| 12. Motor2 | 27. Power voltage (above 4S) |
| 13. Motor1 | 28. Current sensor |
| 14. IMU module plug (Black) | 29. LED indicator |
| 15. IMU module plug (Red) | 30. Battery (Power) |

RC Transmitter Settings

Please read this introduction thoroughly. Because all flying mode is based on using Channel 5 and Channel 6 of the RC Transmitter. Both channels must be set to 3-position switches which is for switching Manual/Auto/Altitude hold 3 modes. Users can check the working state of the switches in the "Flight Mode" on GCS Interface. Please familiarize with the following switch position:

	CH5			CH6
Position 1	Manual	Red light blinks for 3 times		×
Position 2	Stabilization Mode and Altitude Hold	Blue light blinks twice		×
Position 3	GPS Mode	Green light blinks twice		1.Auto-hovering 2.Auto Navigation/waypoint 3. Auto-returning home
Remark1	1. After switching to GPS Mode, CH6 is available. 2. Disengage any flight mode in GPS mode, need to disengage the GPS mode. Example: If you want to fly in Auto navigation/waypoint mode, set CH5 to GPS mode first, then set CH6 to Auto navigation mode. If need to disengage the Auto navigation/waypoint mode, please set CH5 to Manual mode or Stabilization/Altitude Hold mode.			
Remark2	1. "Auto-returning home" for standard version: altitude can be controlled after reaching returning home position. After landing the craft manually, the motors can be shut down only upon switching to stabilization mode. 2. "Auto-returning home" for Enterprise version: aircraft can land automatically when reaching returning position meanwhile 11 %-90% THR can not work, 0-10% THR makes the motors power off immediately.			

CH5 position

Position 1. Manual Mode: all flight characteristics can be controlled manually.

Position 2. Stabilization Mode (Manual) and realize altitude hold through barometer sensor. User can control the aircraft manually but altitude is controlled by the autopilot. We recommend to set CH5 to position 2 before takeoff (the motors may roll slightly) and then push ELE stick to launch the craft; In position 2, the middle THR position is for altitude hold, push THR stick up to make the craft climb up, push THR stick down to make the craft go down.

Position 3. GPS Mode (Auto Mode), please check the instruction of CH6 position showing as blow to activate the sub modes in GPS Mode. Also can operate this way: after capturing the middle position of the craft before takeoff, set CH5 to position 3 and CH6 to position 1, then push THR stick and the craft can take off automatically immediately.

CH6 Position(Notice: it can work only with setting CH5 to position 3 first)

Position 1. Auto-hovering in GPS Mode, the craft will hold its position with releasing the sticks. Pushing/Pulling Elevator stick or moving the Aileron stick left/right to make the craft move. After releasing the sticks, the craft will recover to auto-hovering state.

Position 2. Auto-navigation/waypoint. The craft will fly away without uploading the waypoints before switching to this position, So please make sure the waypoints have been uploaded successfully before switching to this position.(Please check Page XX for waypoint design and upload)

Position 3. Auto-returning home. For setting returning home position, please check Page XX (Returning home position).

When any accident unexpected happen, please switch back to manual mode, in case the craft flies away.

Attention: Set F/S of RC Transmitter as Auto-returning home, throttle should be kept at the range of 10% even more above, to avoid motor power off when throttle range is reaching 10% less. Recommend users to set 30% as the throttle range when returning home and landing.

Ground Control Software (GCS)

Installation

Step1: Download YS-GCS, installing it according to operation system tips.

YS-GCS can be installed easily for Android. Installation can be completed only need to download the GCS to mobile and run it once in file manager.

Apple installation please check Page XX

Step 2: Data Link setup

Way1: Set AP via WIFI Router then connect it. (Recommended)

Way2: Build Hotpoint via Mobile/Tablet.

As WIFI Module set default search and connect wireless network named "YS-X6 AP serial no.", password is 82890430 :example:YS-X6-10200, MUST use WPA2-PSK AES encryption. After opening WLAN and connecting to the router via Mobile, the communication can be established with AP&WIFI powered on, meanwhile it can indicate realtime data in Mobile GS.

In the situation that Mobile is using Hotpoint function, it can not be connected if IP Address is not 192.168.1.X. Thus please add router.

Example: If Mobile IP is:192.168.0.1,the Hotpoint function can not work.

Default User Name:YS-X6-Serial No., password: 82890430

Firmware Upgrade

Step1: Power off AP, Connect 3 pin connector to the COM1 port of the AP, 9 pin connector (DB9) to PC COM port.

Step3: Run firmware upgrade program (can be downloaded in the quad webpage from Zero UAV official website).Select "configure COM port".

In the device manager of the OS, you can see which com port is being used.

Then set its property to be:

Baud rate: 115200

Data bite: 8

Parity: None

Stop bit: 1

Step4: Select the firmware file, please choose a ".arm" file offered by Zero UAV.

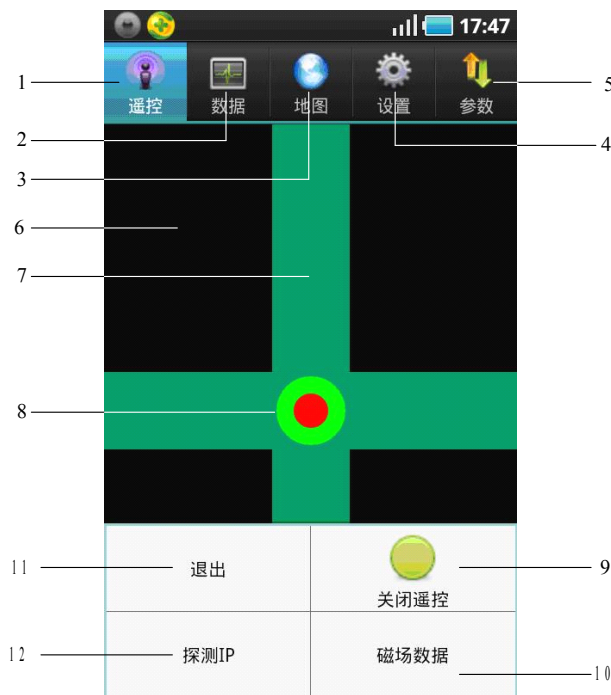
Step5: Power the AP, Upgrade can be completed automatically. Please shut down AP while it indicates “Upgraded, please close the window.” in red words.

Flight data

All the realtime fight data will be saved automatically to a local mobile file named “T+runtime” under the “hj” folder while flying. The tracking file for Apple Users is saved in folder:/private/var/mobile/documents/yswifi

Sending the file to factory when flight obstacles happen, meanwhile this file is also one of the necessary documents for warranty, please preserve carefully.

GS Software Interface



Software Functions:

No.	Content	Functions
1	Remote	Default interface: “mobile flight”

	Control	
2	Data	Realtime flight data of the aircraft
3	Map	Saved map or realtime map
4	Settings	Set various states of the aircraft
5	Parameters	Adjust parameters of the aircraft
6	Control Interface	Mix Control via Mobile
7	Center Button	Control the aircraft via mobile
8	Control Cross	Climb/ Decline/rotate
9	RC on/off	Get into mobile control mode while powered on
10	Magnetic field data	Show the Magnetic field calibration results
11	IP Searching	Reserved
12	Exit	Exit from the software

Remote Control

When the RC Tx set to GPS position hold mode, click the menus in the mobile, if the it is the RC mode, then you can use the Mobile to operate the aircraft.

Listed as below:

1.DO NOT touch any area, then the aircraft will be GPS position hold with ALT hold.

2.Press down the middle circle and do not release it, move your finger to left/right/front/back, or any direction, the the effect is the same to move the AIL and ELE sticks combined.

3.Do not touch the middle circle, but click the different position of the red cross, up/down is for altitude adjustment, the more higher position means the faster climbing speed, the more lower position means the lower Declining speed. Release your finger, and the aircraft will hold the last altitude. Left/right is for

heading, almost the same operation as the altitude one.

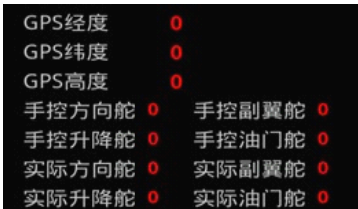
4. When the aircraft is out of the communication range, the autopilot can not receive the mobile signal, then it will change to that of the RC Tx. When it fly back to the WIFI range, then the control right will be returned to the mobile by the autopilot itself.

The Remote control functions shown as below:

RC ON	Operation method	Aircraft states
Circle area	Red: Un located; Green: located.	Keep still
Position hold	DO NOT touch any area	Position hold.
Operation	1. Press the circle and move up/down 2. Press the circle and move left/right 3. Press the circle and move left top, left bottom, right tip, etc.	1. move back and front 2. move left and right 3. Move lefttop, leftbottom, etc.
Climb/ Decline/rotate	click the circle and move in the range of the red cross: 1. top 2. bottom 3. left 4. Right Note (1) The distance to the red dot means the flight speed. The farther, the faster. (2) Press=moving, release=stop moving (3) Release=position hold immediately (4) The Maximum speed is 2.5 m/s	1. Climb 2. Decline 3. rotate to the left 4. rotate to the right
The bottom of the red cross	For "close motors" in the RTH only, take care	Shut down the motors at once
WIFI data lost when flying	Change to Position hold by itself, controlled right back to RC Tx	Position hold automatically
Get WIFI signal one more time	"Open Remote control" by itself when starting the system	According to the current mobile operation state

Data

Click "data" button will change to data interface, seen as below:



QTY of GPS Located satellites



GPS 星数

GPS located satellites QTY

GPS velx(cm)
GPS vely(cm)

xeKF velx
xeKF vely
xeKF veld

The formal speed data after Kalman fliting.
The AP LED will be white is this value has a error that is too big. You need to land the aircraft at once this time. The values should be lower than 20 on the ground.

姿态角

The formal attitude data after Kalman filtering.

Attitude Angle

静态角

Status Angle The real attitude data when the aircraft is on the ground. It is effective without any vibration. When it has great difference with the formal attitude data on the ground, then you need to zero the gyro.

目标编号

Target number The waypoint number that you want the aircraft to fly to. The value can not be 0, and can not be bigger than the QTY of the total waypoints.

飞行状态

Flight mode Flight modes: zero the gyro, manual, path flight, auto navigation, Auto landing with RTH, setting mode

高度

Altitude the baro altitude, unit is meter.

航向角

Heading/yaw

The heading means which direction the head of the aircraft is pointing to. North=0 deg, CW is positive, CCW is Negative. eg: East=+90 deg. West=-90 deg. South=180 deg=-180 deg.

Note: this value has no any meaning when the GPS is not located and the working mode is not auto mode.

飞控电压

AP voltage

AP volt (with payload)

GPS经度 GPS纬度

Longitude and latitude data of the GPS data

(GPS long and GPS lat)

手控方向舵 手控升降舵 手控副翼舵 手控油门舵

(Manual YAW

Manual ELE

Manual AIL

Manual THR)

heading, AIL, ELE, THR in the manual control.
Eg: when the THR stick is in the middle position, manual THR=Middle. When the THR is the minimum one, the manual THR=7. If the difference is bigger than 2, then you need to capture the neutral position data again.

实际方向舵 实际升降舵

实际副翼舵
实际油门舵

(Realtime YAW the real servo output of the AP. When in manual mode, the values are the same with the manual THR/ELE/AIL/Heading.

Realtime ELE

Realtime AIL

Realtime THR)

Vibration parameter Showing the vibration state of the IMU. bigger than 10 means not good. eg: up/down 15, means the vibration in the Vertical direction is too big.

Map

+:Zoom in

-:Zoom out

Map: map mode.

Satellite: satellite mode (select arrcoding to the real situations)

Tips: 1. The map will be the same when the GCS is close down.

2. Will use the cache map when network can not work.




→  (Aircraft position)

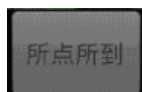
Use this button to locate the aircraft in the map after GPS is located.

→  (Me)

→  (Search)

→  (save position data)

→  (load position data)



Click&Go

This mode works only under 自动悬停 (Auto-hover), click any point on the map and it can appear a yellow smile there. The aircraft will fly to the position where has been clicked and 悬停 (Hover) while yellow round smile changes to purple star smile.



Stabilization

Lock

This mode works only under auto-hover, It will appear a yellow smile while clicking any point on the map, then click "stabilization lock" button. After yellow round smile changing

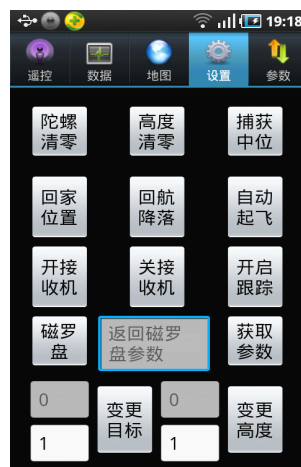
to purple star smile, the head of aircraft will face the locking point, meanwhile user can operate in RC interface. When output left aileron in RC interface, the aircraft will hover clockwise around the locked point. When output right aileron, it will hover anti-clockwise.



Tool

Waypoint design. Please refer to page XX "waypoint flight" regarding the operation ways.

Settings



Notice: All the operations options in settings are vitally important, please operate seriously.



Gyro reset

1. Checking data state, when existing difference between attitude angle and static angle in the situation that aircraft is static on the ground, go this operation.
2. Flight state will change to be " please waiting for gyro reset" after confirming this operation, wait the flight state back to manual patiently
3. After finishing reset, if attitude angle and static angle are coincident in static condition, then reset succeed.

Key tips: forbid resetting during flight, it must be kept no any vibration when operating gyro reset.



Magnetic Compass

Click into magnetic compass calibration mode, the below grey position indicates calibration state, please refer to Page XX regarding the calibration methods.



Capture center position

After channel calibration, releasing operation rod if manual router position is not in the center from data interface or when tuning RC Tx slightly, need to capture the center position of aircraft.



Return home Position

The aircraft will record a returning position when takeoff. If get into auto-returning & landing via RC Tx, the aircraft will fly to the recorded returning position automatically and then landing slowly. But if need to change the returning position, using this function can record the plane coordinates of aircraft at any time any position, then get into auto-returning & landing and back to new returning position.



Returning & Landing

It is useful only when the CH5 remote control is in the 3rd grade, or the receiver is closed. After the order is sent, the aerobat will come back automatically and land slowly. If the above conditions cannot be met, the aerobat will not accept the order and only if you push the button on the remote control, the aerobat can return and land. When the aerobat returns to the place of coming back home, it begins to land. During the process of landing, its position can be controlled by

aileron(aileron) of the remote control and its up and down, just like automatic hover. Meanwhile, the aerobat will stop completely when the accelerator pole of height channels is pulled to the end. If the accelerator channel is in other positions, it will not influence landing.



Auto-takeoff

The aircraft will get into slow speed state after user powering off the receiver, then open RC in RC interface, at last the aircraft can fly automatically by clicking this button.

After takeoff, if get into RC interface late may lead to crash etc. serious consequence.



Power on/off Receiver

Control the switch of Receiver, when receiver is in a opening state, aircraft can be controlled by RC Tx; When receiver is in a closing state, aircraft will be in the state of auto-flying: RC Tx get into GPS mode-Open RC Tx-Close Receiver. After closing receiver, aircraft will not be controlled by RC Tx.



Open Tracking

The function is useful only when the ground station has GPS with 4 stars, and the remote control is under the condition of spot hover and height set, or the receiver is closed. When the "following me" is open, the aerobat will follow the GPS of mobile phone to fly automatically and complete "follow me" automatic flight.



Change target

In waypoints flying mode, it requests aircraft to change current waypoints and fly as current uploaded waypoints. (Note: fill in a number which can not exceed uploaded waypoints number)



Change Height

In waypoints flying mode, set flight height: input needed height to this box, example: filling in 10 means setting height as 10 meters.



Channel Calibration

Please confirm that channel doesn't connect any electric power when calibrating. Example: THR from the minimum-maximum-minimum. GS data displays: manual THR is 7 at minimum position, 90 at maximum position, the calibration is completed.

Special Attention;

When power on first time, please don't configure propeller and only power on the AP, and need to do calibration for the channels. Select "calibration channel" in settings interface, push all sticks on RC Tx to the maximum and minimum after 5s, the leftmost and rightmost, AP auto-collection will finish after 5s. User can observe whether the manual control and real RC Tx control are coincident in the data interface while moving any stick position. Example: When moving THR stick to the minimum, the manual THR rudder will display 7 in data interface, to the maximum it displays 90. When moving aileron, maximum left output of the manual aileron rudder displays left 40, right 40. When changing directions, left output of the manual aileron rudder displays maximum left 40, right 40. When push it up and down, the manual elevator displays maximum 40 push, maximum 40 pull, then calibrations are completed. When all sticks are still, it displays in the middle position.

Must confirm CH5&CH6 are correct before power on the multi-rotor. And confirm whether the flight status bar in GS data interface can switch to "Manual"/Auto-hover/Auto waypoints/Auto-return when checking CH5&CH6. Must confirm THR stick is at the minimum THR position before takeoff(take FUTABA unsetting any anti-direction as standards, need totally reverse directions when using WFLY, you can find the bottom manual directions/aileron/elevator in the 'data' window about the details. The corresponding THR stick of manual THR

position: the number is from the small to big & from bottom to top, need to confirm your operation and displays are coincident, otherwise need to reverse the directions of RC Tx. And set flight mode as manual, set position channel as manual control (namely position channel is put at manual control position), otherwise it's extremely possible to make injure(s) when rotors rotate after powering on.



Enter Settings

It's used to calibrating channel or completing flight parameters. After clicking this button, flight state will display: "settings", after getting into setting state, channel output of each motor on the aircraft is RC Tx THR direct channel, no mixing control, is equal to Y-line of one-many, it's convenient for users to set for all motors at the same time.



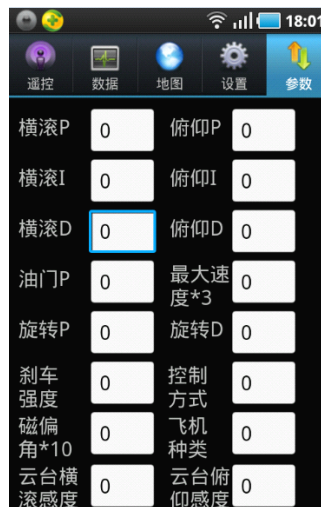
Exit Settings

After general THR calibration or completing parameters, need to exit settings. When CH6 switch into auto-navigation, only open waypoints the aircraft can switch into auto-navigation mode.

[返回](#)

Parameters

Key operations, user only can change several parameters among them.



Please do not change the parameters of roll/pitch/THR/rotation PID



Battery quantity

Battery quantity: AP will calculate the battery power according to the battery quantity which is filled by users. When the mobile vibrates once each 2s, it indicates low power, warn user's attention. When the mobile vibrates once each 1s, it indicates very low power and the aircraft must land at once.



Control Method

Default completing box2{1,aittitude mode(fit to adjust parameters,dynamic flight),2,acceleration mode(fit to static flight)}



Magnetic declination

Fill in local magnetic declination, deflection to West is Positive pole, to East is negative pole(most regions in China are deflecting to West).Example: Magnetic declination is 6degree 30' West, namely 6.5 degree, then fill in 6.5.

Please refer to website about magnetic declination

<http://www.ngdc.noaa.gov/geomagmodels/struts/calcDeclinat>

飞机
种类

Aircraft Type

Fill in flight mix control type, please refer to Appendix 2.

云台横
滚感度

云台俯
仰感度

It's used to adjust the correction angle of gymbal. If user feel correction angle is small, can fill in bigger number, on the contrary fill in smaller number(note: can fill in 云台感度负值)

最大速
度*4

Maximum Speed

Set flight speed.

below 4 parameters need to be filled in when use first time, when filling please enter setting interface firstly, after completing then click uploading to AP, it only can fly after getting confirmation of parameters.

遥控方式

RC Method

User select the options according to current RC mode

Self-adaptive: AP select the options according to the using RC Tx.

Normal: Normal FUTABA Receiver, AP CH1 connect Receiver CH1, AP CH2 connect Receiver CH2.

S-BUS: Only connect AP CH7 to the Receiver S-BUS port

电压初始 报警值

Voltage initial warning number

Fill in the warning voltage which each battery is been using, user can fill after measuring by self. Usually fill in 3.65.

电调类型

ESC Type

Filling according to the ESC type which user is using.

Note: Wrong filling between Normal ESC and XA ESC will lead to the propeller go out of control after being powered on.

舵机输出 频率

Rudder output Frequency

Filling according to the Rudder which is being using, 50HZ is i 模拟舵机, 250HZ is digital rudder

[返回](#)

Trial Fly

Checking before the flight.

Please make sure you have assembled your Multi-Rotor.

Please make sure you have set all parameters correctly.

Any one of the situations as below may lead to serious accident.

- ▶ The motors rotate reversely
- ▶ The propellers are assembled in wrong way.
- ▶ The IMU is assembled in wrong way.
- ▶ The connection between instruments is wrong.

Must open the RC Tx first and then the receiver. Power on AP first then motive power.

Please use auto-hover mode to do the fly test and attitude sensitivity adjustment in empty & weak-wind space

Please check whether the hj file can be saved to the mobile successfully (Only if power on the AP, It can be formed after connecting the data.)

Fly Test

Step1: Make sure the adequate power to the RC Tx/AP and all components.

Step2: Check all the connections to make sure everything is in good condition.

Step3: Open RC Tx, then start the Multi-Rotor aircraft.

Step4: Switch control mode of RC Tx and change over the switch to make sure it works successfully.

Step5: Get into Auto-hover mode. Check the moving trend of AP whether is correct via pushing joystick along elevator/roll/航向角 directions of AP. If it's not correct, please get back to parameter settings to revise your settings.

Step6: Push THR stick slowly to make all motors work, then make your Multi-rotor aircraft take off slowly.

Fly

Magnetic Compass Calibration

The magnet on aircraft or neighboring magnetic filed can affect the magnetic compass to read the Earth Magnetic Field, thus may reduce controlling

precision of Multi-Rotor aircraft even effect obstacles. Calibrations can reduce these effects to make sure the MC work normally in defective magnetic environment.

Calibration for first use

When the machinery installations of Multi-Rotor Aircraft are changing:

Change the position of GPS magnetic compass module;

Add/remove/displace the electronic devices such as MC/舵机/battery etc.

Calibration Steps

Step1: Select level calibration after clicking magnetic compass calibration.

After confirmation, it will display whether AP received the order of level calibration on magnetic compass in the middle status bar. If there is a successful display there, you can start the level calibration: level rotate the aircraft 2-3 laps slowly, can ask you assistant to monitor the attitude angle in "Data" window, please try best to make sure pitch and toll is within 3degree when rotating (example: left 2/lift 2 is OK, but left 3/lift 2 is not good; It's ok to exceed 3 occasionally, AP shall stop collecting data while exceeding 3 degree and continue to collect data when recover 3degree less),also can look the blinking light which connecting with AP, blinking light meet attitude requirements, off light means the attitude is too big.

Step2: After completing level rotation of 2-3 laps, make the craft head face the ground vertically, then select "Magnetic compass Vertical calibration" in GS, after sending out please confirm whether it's successful in the status bar, and then the roll and pitch will change close to 0 degree slowly via checking the attitude angle in "Data"(namely changed reference coordinate system, it's level when the craft head face the ground).Then take the craft head as Axis and keep attitude angle within 3 degree, level rotate 2-3laps. You can also check the blinking lights which are connecting with AP, blinking

lights meet attitude requirements; off lights indicate a too big attitude.,



Step 3: Get through above operation, finished magnetic compass calibration, the GS can switch to RC Interface automatically, after waiting for tens of seconds, mobile will display the magnetic sensor data of AP, only look the red and blue circle in the middle of cross coordinates, if they are close to standard round, then indicates a successful calibration and data in good condition.

Path Flight

Steps

Step1: click "tools"->"path settings", to generate the waypoints, one click on the map can get one waypoint, get all the waypoints one by one. Click "restore default" to finish the path generating.

Step2:After generating the path, click "upload path" to send the path data to the AP. Check if every waypoint change to blue to confirm the uploading states, and check the QTY of the waypoints in the "target number" item, see if it is matched with the QTY of the set ones,if not ,re-upload it one more time. Any waypoint that is not changed to blue, can be re-uploaded with all the other waypoints, or re-uploaded for itself.

Step3: Click "remove waypoints" to recover the blue waypoint to Red, then

select "Verify waypoint" from "Tool", download 机载 waypoints to ground station for comparing, if all waypoints are blue, that indicates the saved waypoints in RC are coincident with GS waypoints and waypoints checking succeed. Otherwise need to upload waypoints again.

Step4: AP shall get into auto-waypoints mode while putting Channel5 of RC to auto-positions , Channel6 to auto-navigation bar. Arriving first point 悬停, set number2 in "change goal" of setting interface and upload, then beginning waypoints flying according to the order of 2、3、4..... even finish all waypoints and go back to first point to hover。

Simple problem solving

1	Aircraft rotates	Check the Magnetic heading calibration
2	Altitude changes	Check the vibration staes.Try to reduce the vibration of the motors and do the prop balance operation
3	Aircraft rolls at once after launch in the stablization mode	1.Check the connection of ESC cable and the MC ones 2 Check IMU setup direction
4	No WIFI signal on the laptop/mobile side	1.Check if any interface loosen 2.Out of the communication range? 3.Power not enough on the laptop/mobile side?

		<p>4.DO Not power the motors, but try to control the aircraft via RC Tx;</p> <p>Check if the WIFI LED can match the rules.</p> <p>If not, check the mobile-AP-WIFI data link.</p> <p>5. Was the Network ID of the router set to YS-X6-X(Serial number)?</p> <p>6. Router IP is :192.168.1.1?</p>
5	Altitude changes too much when the movement is bigger	Check the vibration damping
6	The aircraft is not stable in the position hold	晃动超限—Sorry, I do not catch this word yet.
7	Much drift in the position hold	Check if the LED flash one time on loop?Did you capture the “neutral position” after adjusting the trims in the stabilization flight?
8	Can not control the aircraft in the stabilization mode	Not located, still not start to calculate the formal attitude data

Appendix

Appendix1:the each port definition

AP box

CH1 AIL

CH2 ELE

CH3 THR

CH4 YAW

CH5 Working modes: manual/stabilization/GPS

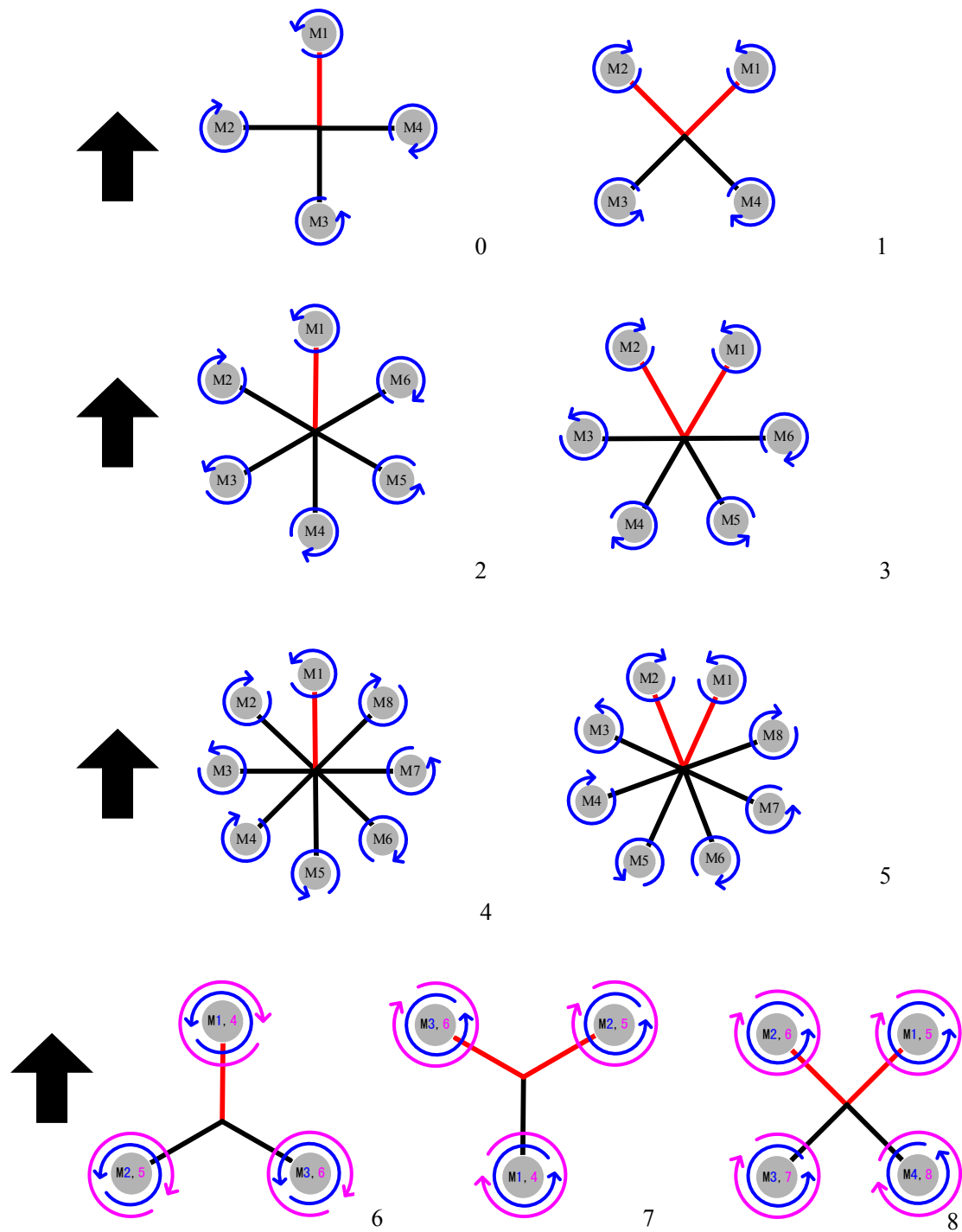
CH6	Sub working modes of GPS mode
CH7	S-BUS supported
CH8	
COM1	COM port, linked to PC to upgrade firmware
COM2	
COM3	Data interface of the WIFI module
AI0	
AI1	Amh module interface
LED	LED lights
IMU1	IMU module power interface
IMU2	IMU module data interface
M1	motor 1
M2	motor 2
M3	motor 3
M4	motor 4
M5	motor 5
M6	motor 6
M7	motor 7
M8	motor 8
EXT1	Gimbal tilt
EXT2	Gimbal Pan
EXT3	
GPS1	GPS module power interface
GPS2	GPS module data interface

Appendix 2: the supported Multi rotor helis

For those with props on both top side and bottom side, blue means the props on the top, purple means those on the bottom. In the other situations, all the props are on the top.

The arrow in the figures means the head of the aircraft, the "aircraft type" item

in the parameter settings, can be filled with the number on the left bottom of the aircrafts below.



Appendix 3 : LED description

GPS unlocated, red LED blinks for 3 times a loop.

GPS located (5 satellites), red light blinks for 2 times a loop.

GPS located (6 satellites), red LED flashes for one time one loop.

When the QTY of located GPS satellites is more than 7, the Red light be solid all the time.

When the Speed data got from the Kalman filtering data fusion using the GPS data is too large: the White LED will be solid, need to land the aircraft at once.

Altitude hold in the Stabilization mode: Blue light flashes in loops, one time one loop means the users is controlling manually, two times one loop means Altitude hold.

In the GPS mode, green LED flashes in loops. One time one loop means the user is controlling manually, two times one loop means GPS position hold with baro altitude hold.



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